RESEARCH SUMMARY

forest sciences
NELSON FOREST REGION

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CASE STUDY: Patch Cutting in Old Growth to Address Concerns About Wildlife Habitat and Clearcut Adjacency

By Lauren Waters

- **Small patch cutting can address both timber needs and clearcut adjacency concerns.**
- **Patch cutting using conventional and cable systems on 1-ha patch openings is operationally feasible.**

INTRODUCTION

Large scale fragmentation of mature and old-growth timber as a result of recent harvesting has been identified as a major concern for wildlife in the lower Goldstream Valley in the Revelstoke Forest District. The remaining old growth is critical for maintaining resident species such as moose, caribou, mule deer, bears, and cavity nesters. At the Forest Development Plan stage the Ministry of Environment (MOE) requested that the licensee, the Revelstoke Community Forest Corporation (RCFC), include more partial cutting with extended rotations in the Plan.

In 1996 the RCFC, in an effort to address the MOE's concerns, planned that group selection silvicultural systems (1-ha patches) should be used to harvest blocks in the lower Goldstream Valley (Figure 1). The objective is to harvest timber while still meeting clearcut adjacency and green up requirements.

The specific objectives were to:

1. Produce an uneven-aged stand of cedar, spruce, hemlock, Douglas-fir, and white pine over a 120-year rotation with an average stem diameter of 34 cm and a net volume of 749 m³/ha.
2. Maximize snow interception and thermal cover by maintaining a dense canopy cover over a minimum of 60% of the block area.
3. Minimize impacts on wildlife and promote biodiversity by, for example, ensuring 25 m³/ha of coarse woody debris (CWD) remains on the block and ensuring groups of wildlife trees are reserved that total 7% or more of the block area.
4. Maintain, in perpetuity, a minimum of 60% of the block area in 40-year-old or older forest. The site will be composed of discrete even-aged groups of 1 ha or less which will be harvested at approximately 40-year intervals.

A total of nine blocks are planned in this area. As of (insert month/year) two of these blocks have been laid out and harvested (Figure 2).

SITE DESCRIPTION

This case study reviewed patch cutting in two blocks. CP 280, Block 1 is 97 gross ha with a

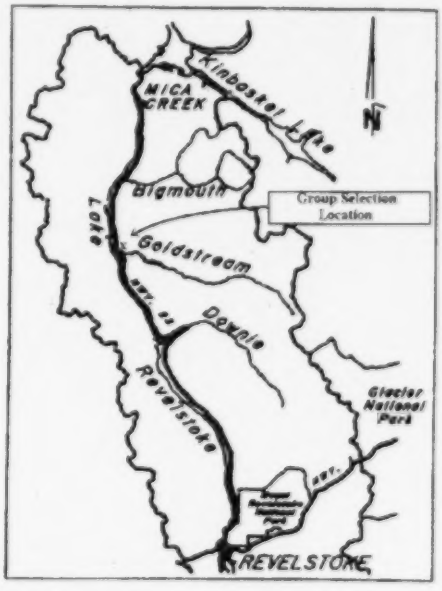

Figure 1. Location of case study.

net area of 28 ha in first-pass openings. CP 280, Block 2 is 31 ha with a net area of 9 ha in first-pass openings.

This site is located approximately 100 km north of Revelstoke, in the lower Goldstream River valley on Lookout Mountain. The blocks are located in the Interior Cedar Hemlock - wet, cool (ICHwk1) biogeoclimatic subzone. Elevation ranges from 640 to 1040 m, and terrain in both blocks is variable, ranging from gently rolling and hummocky to some steep slopes. The soils are relatively thin podzol (30 cm) overlaying a root-restricting carbonate layer. The species composition is Hw45, Cw46, Sw3, Pw4, Fdi1, Bl1, most of it overmature. Merchantable volume is approximately 350 m^3/ha, stand density is 340 stems/ha, average tree diameter is 52 cm, and average tree height is 33 m. Generally the timber quality is poor due to a high percentage of rot in hemlock and cedar, resulting in a high component of wood that is pulp grade (Figure 3).

PLANNING AND LAYOUT

All nine blocks are to be managed on an uneven-aged basis using a group selection silviculture system. Harvesting will take place over a 120-year rotation with stand entries scheduled approximately every 40 years. Each pass involves the removal of several well-spaced patches of approximately 1 ha or less. The total volume for each pass is not to exceed 40% of the total volume available.

Planning by RCFC and Silvatech Consulting Ltd. at the Forest Development Plan stage identified external block boundaries for the group selection treatments. These blocks were designed to allow perpetual removal of wood fibre while maintaining wildlife habitat. In 1996, Silvatech Consulting developed a three-pass total chance plan for each block, and completed first-pass layout and initial silviculture prescriptions.

The total chance plan attempts to minimize the skid trail network while considering timber availability, block spacing, operability, and existing access. Final layout was determined on the ground. There were 43 patches in the two blocks: 36 were planned for conventional ground skidding on a snow pack, and 7 were planned for cable harvesting in either winter or summer. The second- and third-pass openings were paper planned and field checked to ensure operational feasibility.

One-ha openings were used because they are within the appraisal definition of partial cutting, and to allow safer and more cost-effective operations when working in large old-growth timber. The 1-ha openings are generally large enough to fall trees internally, thereby protecting the regeneration in adjacent openings. The openings harvested with cable systems were designed to be roughly two tree lengths in width (60-70 m) whenever possible, and were generally over 1 ha in size due to their length.

An extensive road network, already in place in this area as a result of previous harvesting activities, reduced the amount of road layout and construction required. Permanent skid trails were pre-located to allow access to the first, second, third, and fourth passes. The skid trails were marked with paint on trees rather than flagging tape to avoid confusion with the flagging tape used to mark other harvesting components.

Previously built landings were utilized where feasible. The intention was to have approximately 3 to 4 openings per landing for efficiency. The use of rub trees was anticipated, and the prescription provided for leaving these for wildlife or removing them if they were significantly damaged.

HARVESTING

Harvesting of the two blocks commenced in mid January and continued until late February 1997 using both con-

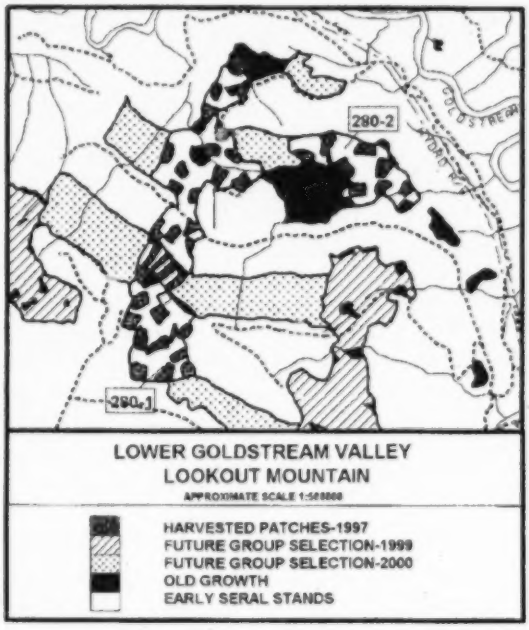

Figure 2. Block layout.

Figure 3. Hw stem with high percentage of rot.

ventional and cable-harvesting systems. Approximately 5640 m of skidding corridor construction was required to access the first-pass openings. An additional 1700 m of trails will be required to access future passes. Skid trails were built with an excavator, using packed snow for the running surface and any fill areas. There was approximately 1-2 m of snow on the ground during harvesting operations. Site disturbance as a result of skid trail construction was minimal (Figure 4).

The loggers expressed some concern that the 1-ha opening sizes were too small to easily and safely start falling the trees, and that more care and attention were required to do the work. They were also concerned that falling was completed within one day, and thus the non-productive moving time seemed relatively high. Harvesting production on the conventional ground was approximately one patch/day (or ten logging truck loads/day). There was some confusion about the opening boundaries and the harvesting of correct areas due to the large volume of ribbon and paint required for patch layout.

Cable harvesting required extra set-up time and resulted in slower production and additional costs for these openings. On two narrow openings (30-37 m) it was difficult to yard the logs onto the landing while allowing sufficient room for the machinery to manoeuvre. Due to Workers' Compensation Board concerns about roadside yarding, larger landings or jump-up landings were constructed to ensure that at least two-thirds of the longest log would fit on the landing.

Figure 4. Aerial photo of patch cut harvesting.

SILVICULTURE

The openings were assessed in the spring of 1997 for fire hazard abatement and plantable spots. Although the intention was to clean yard/skid, i.e. leave as little debris as possible, to permit planting without any site preparation, a plantability survey showed that approximately one third of the patches required site preparation to create plantable spots. A small hoe was used to make small piles.

Reforestation plans for the first-pass openings include planting a mix of cedar, spruce, Douglas-fir, and white pine, as well as managing remaining advanced regeneration and natural fill in. RCFC plans to leave two or three openings strictly for natural regeneration. The reduced planting costs will offset some of the additional planning and harvesting costs associated with this prescription. The units will be monitored for plantation and natural regeneration success.

COSTS

Extra planning, layout, and marking were significant; it is estimated that these costs were three times those of a conventional clearcut area. Harvesting costs were 10% higher than for conventional ground-based clearcut harvesting due to longer skidding distances and more difficult falling. Cable-harvesting costs were 10 to 20% higher as a result of extra set-up time and slower production. Silviculture costs are also anticipated to be higher than average.

SUMMARY

Patch cutting using conventional and cable systems on approximately 1-ha patch openings is operationally feasible. However, in this case study, costs for patch cutting were higher than for conventional ground-based clearcutting. Nevertheless, this approach is a good compromise for achieving timber-harvesting objectives while meeting green-up adjacency requirements of the Forest Practices Code and maintaining some biodiversity attributes.

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